ABSTRACT OF THE DISCLOSURE

A method and apparatus for scanning electron microscope measurements which maintains a constant e-beam dose to the surface of a wafer being measured and thereby maintains a constant resist shrinkage. The apparatus provides a magnetic lens, a movable wafer holder to adjust the distance between a wafer and the magnetic lens, an image detector, means to determine the distance between the wafer and the magnetic lens, a retarding voltage applied to the wafer holder, means to adjust the retarding voltage, and means to focus the magnetic lens. The apparatus also provides feedback systems between the movable wafer holder and the means to determine the distance between the wafer and the magnetic lens, between the image detector and the means to adjust the retarding voltage, and between the image detector and means to focus the magnetic lens so these adjustments can be made automatically. The method first sets the distance between the wafer and the magnetic lens. The method next determines the charge on the wafer and adjusts the retarding voltage accordingly, thereby maintaining a constant accelerating voltage for the electron beam regardless of charge on the wafer. Finally the method focuses the magnetic objective lens. Maintaining a constant accelerating voltage for the electron beam regardless of charge on the wafer maintains constant resist shrinkage regardless the amount of charge on the wafer.